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Abstract

Based on results of 325 surveyed, the paper shows Van Phong Bay is the hot point of improving awareness of environment and natural resources. It is diversity and abundance of ecosystems and natural resources but their exploitation was unsuitable, so quality and quantity of ecosystems have reduced. Communities are low education, as results, these are negatively impacted to local people's awareness of natural resources and environment. In addition, the awareness also is low. The people groups who were less awareness were at Ninh Tinh, Hai Trieu, Dam Mon, Bai Tre and Van Gia. In addition, Van Gia, Bai Tre and Dam Mon villages are essential for improving awareness of environment and natural resources.

Introduction

The marine natural resource of Vietnam, in general, and Khanh Hoa province in particular have been decreasing rapidly. There are many marine ecosystems such as coral reef, mangrove, seagrass being destroyed for living purpose of local communities. Previous studies have shown that the coverage of coral reef in the Khanh Hoa province has decreased more than 30%. Similarly, the mangrove has been decreasing at considerable level. In 1982 the Khanh Hoa province had more than 800 ha of mangrove; the total area is only 100 ha at the present. The biodiversity of species in the mangrove has been reduced more than 66%. Sea grass bed reduction has been from 33.38% at Cam Ranh up to 85.71% at Nha Trang during a period of 5 years from 1997 to 2002 (Nguyen Tac An, 2005). As a result, a lot of species are in danger such as seahorse, top shell, anemone fishes. One of the main reasons for this disaster is the low level of awareness of the fishermen and communities on long term benefits of those ecosystems. Consequently, increasing the awareness of communities on natural resource is necessary and urgent. Van Phong bay located at the North of Khanh Hoa province. The total area of the bay is about 46,100 ha (Nguyen Tac An et al., 2004). Van Phong bay has good conditions for developing the marine economic. In fact some activities might damage the environment and resources.

One of the main reasons for continuing destruction of the ecosystems of the earth, in general, and marine ecosystems, in particular, is the low level of awareness of people about these ecosystems. The present project will help people in Khanh Hoa gain more understanding of some important marine ecosystems such as coral reefs, seagrasses and mangroves. The score of this work is to estimate the understanding of the coastal communities along Van Phong bay and select some of communities for increasing awareness on marine environment and living resources, which will help to protect and use the resources sustainably.

Material and Methodologies

Field trips were carried out at coastal villages in Van Phong Bay in July 2005. Information were collected based on the PRA method, detail is the interviewing method with the questionnaires. There are 4 main units and 34 questions in the questionnaire.

Study areas included 10 villages of 2 districts in Van Ninh and Ninh Hoa. At each village, about 30 householders were chosen randomly. However, because there is not enough the samples, the data sets of Ninh Yen and My Giang villages were combined together. Number of interviewee in the data set was shown in table 1.

Table 1: Numbers of the data set

Village	Code	Number of samples
Ninh Tinh - Ninh Phuoc	1	44
Hai Trieu - Van Long	2	38
Dam Mon - Van Thanh	3	22
Bai Tre - Van Thanh	4	31
Tuan Le - Van Tho	5	26
Van hung	6	30
Ninh Yen - My Giang - Ninh Phuoc	7	21
Phu Hoi, Van Thang, Van Ninh	8	61
Van Gia - Van Ninh	9	52
Total		325

Sampling structure distributed in fig. 1 and 2.

Table 1 showed that there were 325 samples, which were collected in these field trips. The interviewee distributed mainly in the labor age (from 18 to 60 ages) (Fig. 1). Activities of these groups have impacted directly and indirectly environment and natural resources in Van Phong Bay. Balance of gender has not occurred in the samples (fig. 2, left), and educational levels of the interviewee depended on space factors. Most of the interviewee at Bai Tre were low education (more 80% were illiterate and element school) while at Van Hung, the educational levels of interviewee were secondary school and more. However, the data set could represent presidents in Van Phong Bay.

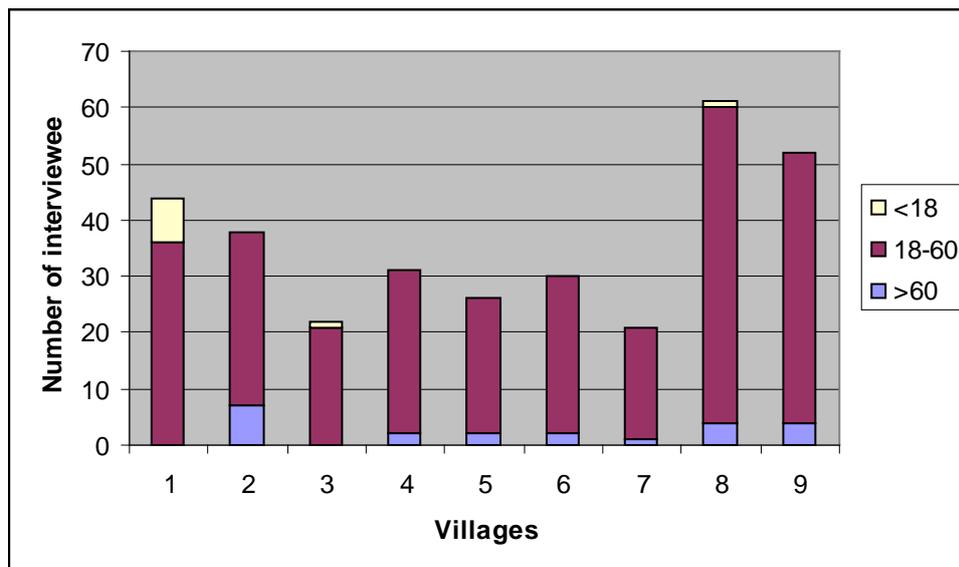


Fig. 1: Ages distribution of number of interviewee in the data set

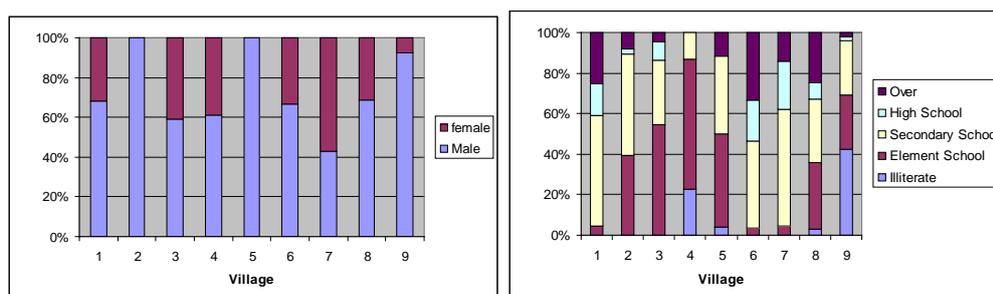


Fig. 2: Gender structure and education levels of the data set

Data analysis: Data were analyzed on SPSS and Excel softwares.

Results and discussions

Status of awareness of local people about natural resources and environment

Based on data collected from field trips, Fig. 3 shows that Van Phong Bay has most of special ecosystems in the tropical region. These are mangrove forests, coral reefs, seagrass beds and others, in which coral reefs are recognized easily. They distribute around study villages. Mangrove forests locate at some villages such as Ninh Tinh, Hai Trieu, Bai Tre, Tuan Le, Phu Hoi, Van Gia but residents' awareness of distribution of mangrove forests in their areas was very different (fig. 3). Specially, most people living in Tuan Le village identified mangrove forests existed. Similar mangrove forest, seagrass beds distribute at some villages with different awareness. In addition, other ecosystems also exist around Van Phong Bay but local people rather know because they have not related with their living and life. Van Phong Bay is diversity and abundance of coastal ecosystems of tropical regions.

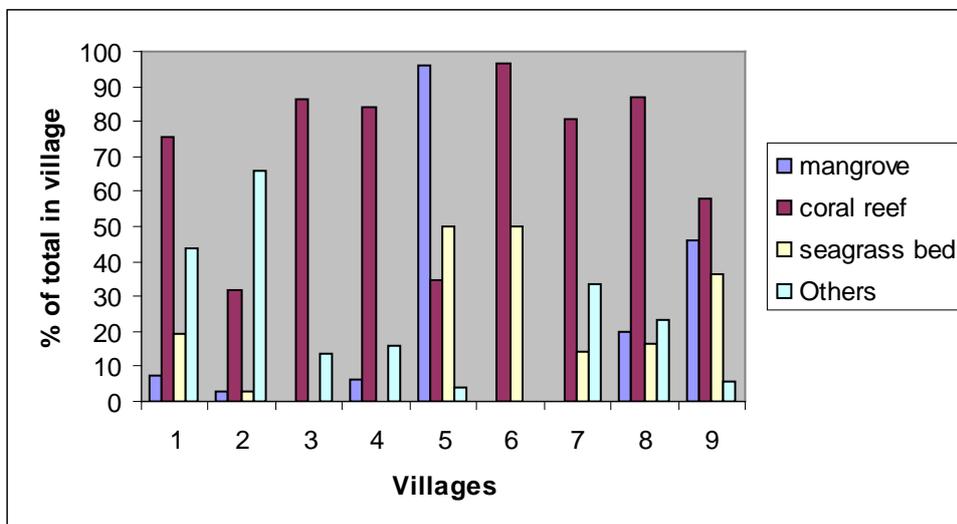


Fig. 3: Ecosystem kinds in Van Phong Bay

Local people showed that these natural resources could be affected their profits. In 315 questionnaires, 293 people agreed that these natural resources impacted directly and indirectly their economic activities. Some people said natural resources were not impacted to them (22/315). Their occupation did not relate with natural resources such as pupils, middlemen and officers. This showed that although natural resources, of course, are important part of their living and studying, these resources could not create economic benefit for them.

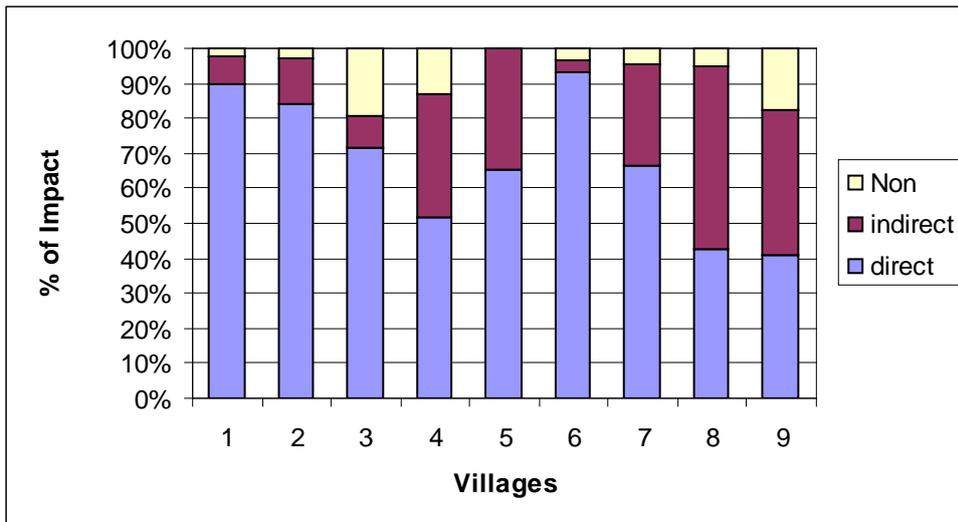


Fig. 4: Effects of natural resources on economic activities at villages in Van Phong Bay

There are some issues in local people's awareness about organism resources. In Van Hung, Tuan Le and Phu Hoi, more than 50% of interviewee knew what have born fishes. In studied villages, a number of people showed they were born from marine. High values were found at Ninh Tinh, Hai Trieu, Dam Mon, Bai Tre and Van Gia (Fig. 5). This was not right thinking. This demonstrated that the awareness of the local people in studied areas is rather low. However, their assessments of ecosystem changes were significant different (fig. 6) but most of them indicated that quality and quantity of marine resources have reduced rather quickly (figs. 6 and 7).

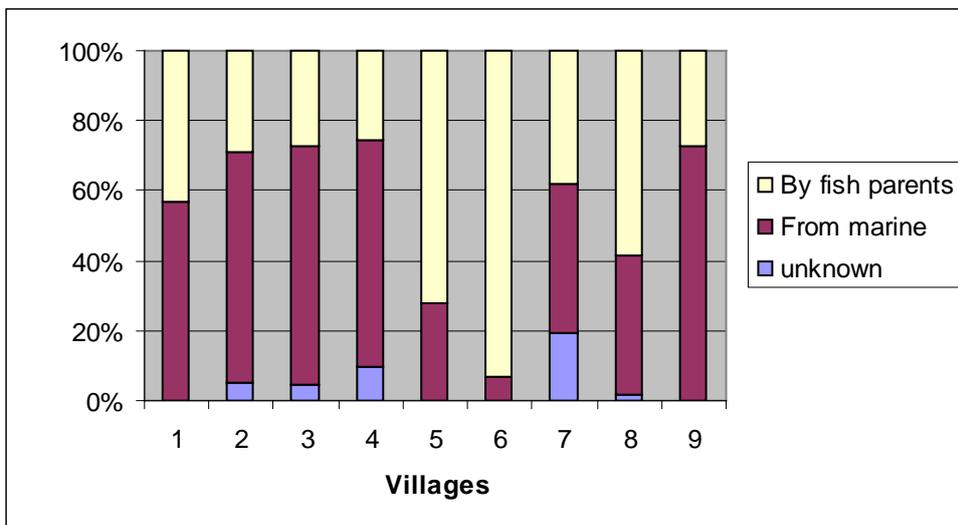


Fig. 5: Awareness about where marine fish come from.

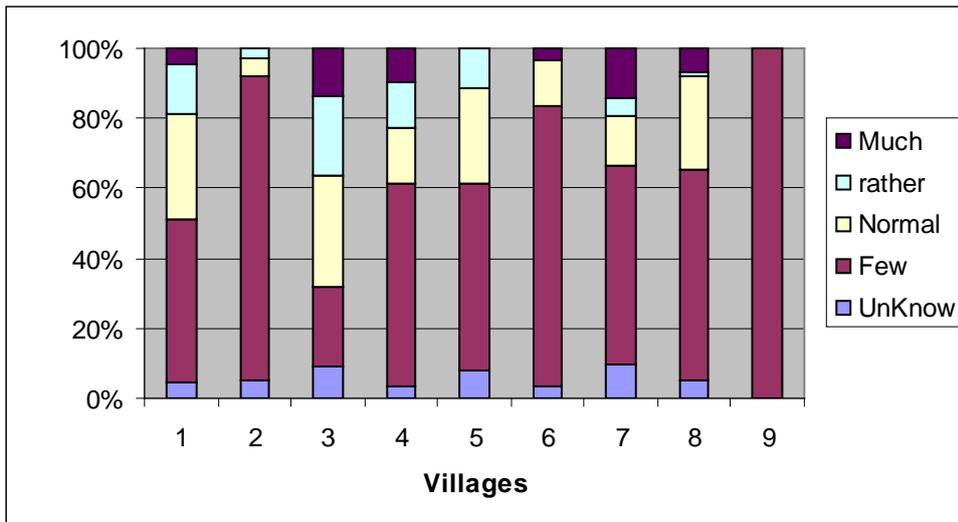


Fig. 6: Awareness of changes of natural resources in Van Phong Bay

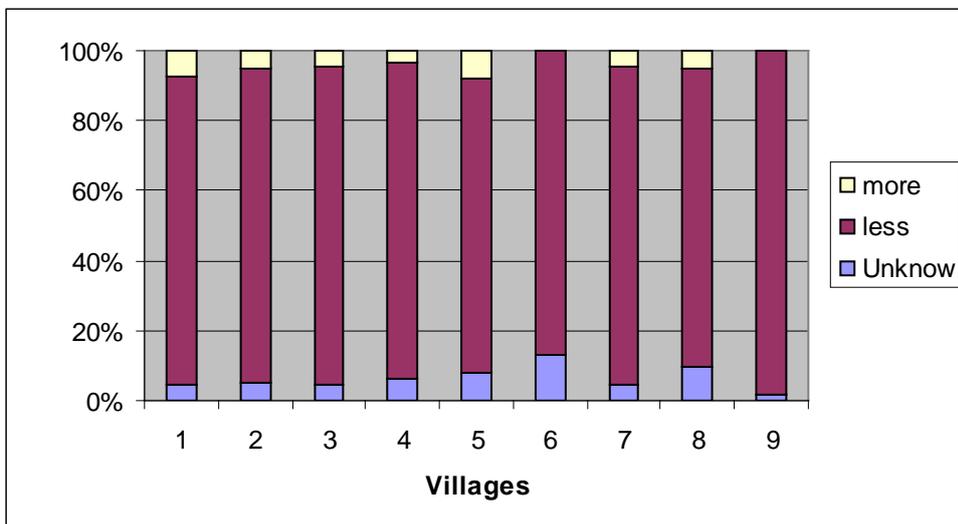


Fig. 7: Comparison of quality of natural resource with the past.

Similar as natural resources, resident indicated that marine environment was negative changed during last decade. 8/9 studied villages have more than 50% of interviewee who said environment was more dirty or worse. Some of them said that environment at their living changed to better but the number of them was not so much (fig. 8). Specially, in Tuan Le (5), there are many people who did not consider with this problem (about 50% of interviewee).

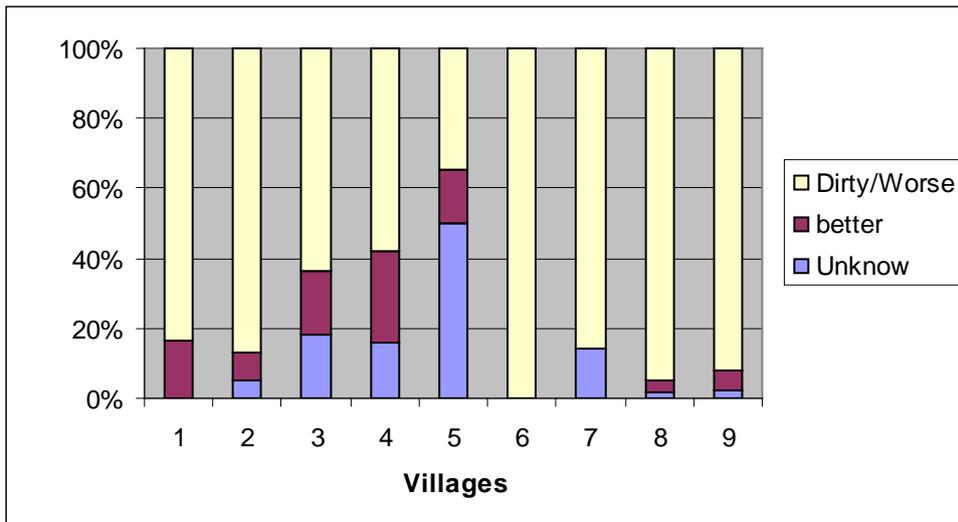


Fig. 8: Resident's assessment of environmental changes in Van Phong Bay

However, there is a good signal of changes of environment and natural resources. Figs. 9 and 10 showed that more 80% people knew the reasons that caused reduction of natural resources and nearly 100% of them showed that any change of environment often impacts to status of natural resources.

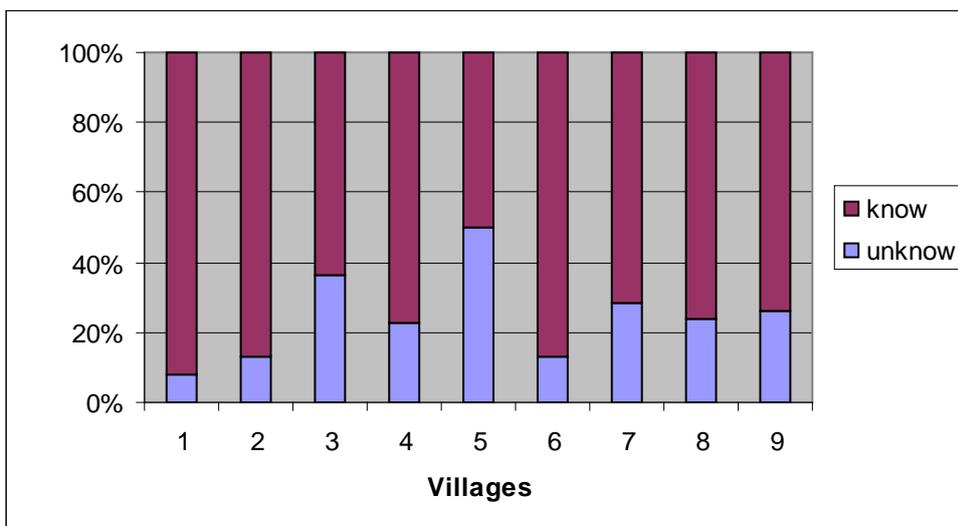


Fig. 9: Resident awareness about reasons of changes of natural resources



Fig. 10: Resident awareness about impacts of environmental changes to natural resources

There are lots of reasons, which caused reduction of natural resources. Local people said that the main reasons were overfishing by illegal methods such as using fishnets with small mesh; small booms and cyanic poison. They also said that connection between increasing number of fishing boats and ships with size of fishes caught under legal has caused reducing stock of fishes in Van Phong Bay. Some other ideas showed that destruction of special ecosystems such as mangrove forests and coral reefs to development of other economic sectors (shrimp culture, lobster cage culture and ports) has changed living environment of marine organism, and then impacted directly to marine resources. In addition, environmental pollution that was caused by transportation, industry and others has pressured on sustainable development of natural resources.

As mentioned above, Van Phong Bay is diversity and abundance of ecosystems and natural resources but their exploitation was unsuitable, so quality and quantity of ecosystems have reduced. However, awareness of local people was limited. They knew what caused these reduction but they cannot stop which they did because of their life. In general, the people groups who were less awareness were at Ninh Tinh, Hai Trieu, Dam Mon, Bai Tre and Van Gia.

Status of human activities in natural resources protection

Beside assessment of status of human awareness of local people, the projects also recognized activities of protection of natural resources. The first, every people know that any activities of economic sectors have been impacted on status and changes of natural resources. Some of popular economic sectors in Van Phong Bay are fishing and aquaculture. The surveyed results showed that most of householders work in fishing and aquaculture. Except Van Hung village, more than 60% of households in other villages work in aquaculture or fishing (Fig. 11). Fishing has been affected on natural resources because some illegal fishing methods also are used in Van Phong Bay.

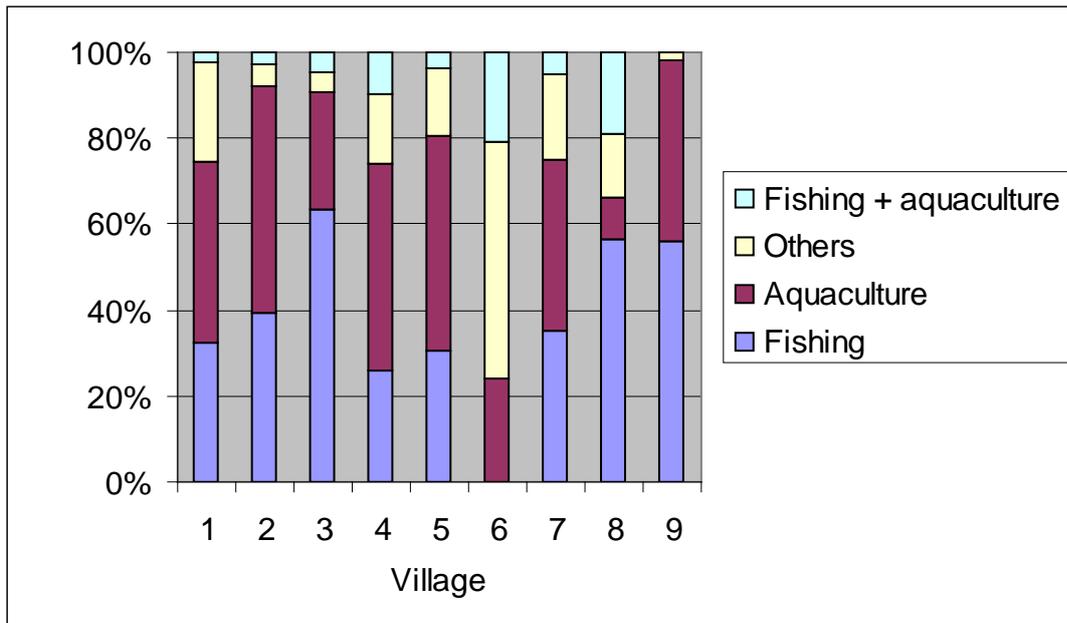


Fig. 11: Economic structure of villages in Van Phong Bay

A lot of farmers and fishers showed that there are several fishing-methods used in Van Phong Bay. They are small booms, gill netting, using net with small mesh, poison fishing and electronic pulse fishing. In 274 surveyed, 97 fishermen said they have used small boom to catch fish, 104 fishers said they have used gill net with small mesh size, and 53 people said they have used electronic pulse fishing. Although several fishing methods have been illegal, they are used normally in Van Phong Bay. However, the fishers know that illegal methods have been affected to natural resources, but they have to use them to earn some things for their life.

Beside of fishing, aquaculture also affected to environment and natural resources. According to Nguyen Tac An and Phan Minh Thu (2005), to culture 12040 lobster cages in Van Phong Bay and Cam Ranh Bay, farmers have used 22658 tones of trash fish, making up 34.3% of total fishing products of Khanh Hoa Province. Further, in Van Phong Bay, shrimp culture also is popular activities. Haft of interviewees showed that they did in aquaculture. In during aquaculture cycles, trash fish is mainly used. They also know that their activities can be affected negative changes of environment and reduction of natural resources.

Activities of economic sectors have influenced natural resources, but there are some signals from local people about their awareness of changes of environment and natural resources. The surveyed results show that waste put into the marine has reduced quality and quantity of environment and natural resources. They said that they knew waste materials affected to fishes or prawn/ shrimp (fig. 12) but their activities have produced a lot of wastes, especially the nylon waste.

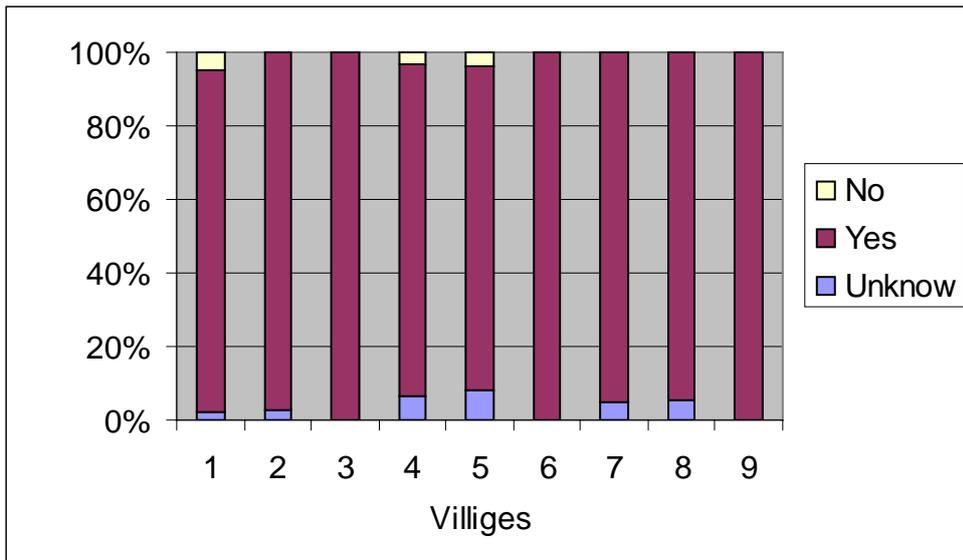


Fig. 12: Awareness about effect of waste to natural resources

In addition, the results also showed that they have participated or done themselves all of activities of protection of natural resources and environment. Excepted Van Gia, in other villages, most people knew how they can do to analysis waste and to protect natural resources (fig. 13). And they do these activities very well.

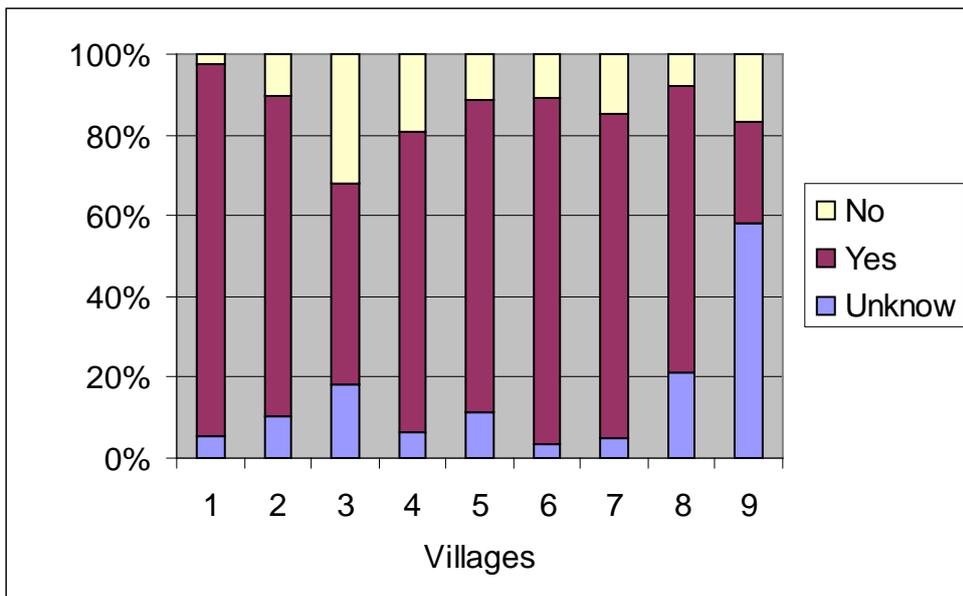


Fig. 13: Status of human activities in social activities in improving environment and protecting natural resources.

The interviewees said that they have done a lot of things for improving and protecting natural resources and environment. They are stopping throwing waste into marine, participating preventive hygiene for marine and coastal areas and picking up animal corpses. Local people have applied the new technologies in aquaculture. They are eco-aquaculture such as poly-culture between lobster with green muscle, lobster with holothurians, mixed shrimp culture and mangrove forest. Further, local people have participated in some protecting natural resources, such as planting mangrove forest, preventing destruction of coral reefs and preventing environmental pollution from inland

activities. However, they are unplanning activities. They have not controlled by community authorities.

When a activity which related to environmental and natural resources was organized by NGOs or GOs, participant of local people are not so many. In some villages, a few of local people are participated in environmental activities, such as Van Gia, only few percentages of interviewees showed that they have been done it. In Ninh Tinh, Hai Trieu, Bai Tre and Tuan Le, the participants are about 60% of surveyed who have joined in environmental activities (Fig. 14). So many people have not ready joined in environmental activities.

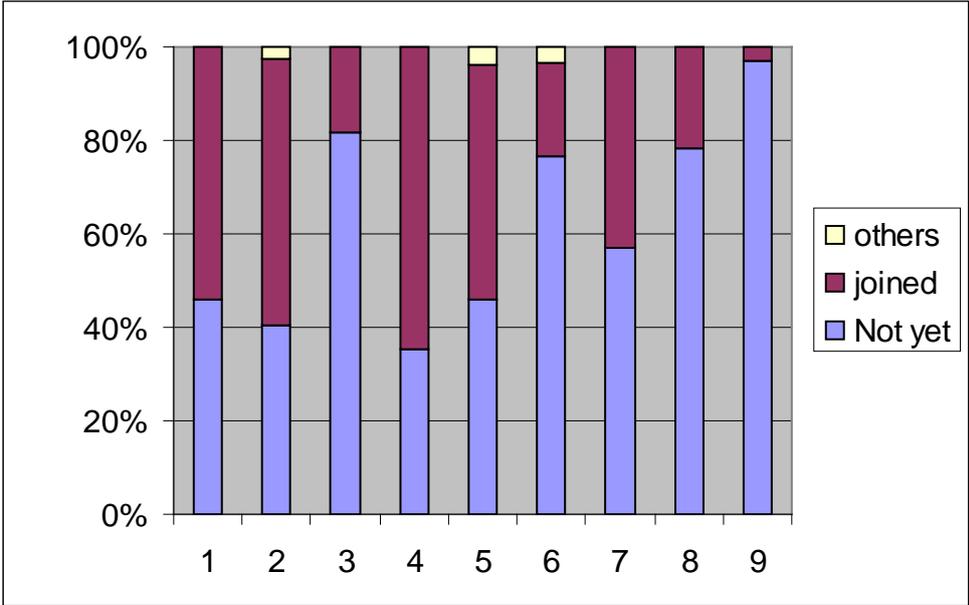


Fig. 14: Statistics of human participate in activities of improving and protecting natural resources and environment

The activities of improving environment and protecting natural resources which have been carried out in Van Phong Bay are environmental seminars, environmental propaganda, setting up marine protected areas (such as Ran Trao MPA), preventing fishing by illegal methods and protection of natural resources based on communities. In addition, there is a method of natural resources based on bottom up feedback from local people. They have suggested some ideas for natural resource protection and environmental prevention. Especially, they proposed that the government should carry out institutions and legal strictly and clearly.

As mentioned above, in coastal villages around Van Phong Bay, local people have known their economic activities would be affected to natural resources. Because of their life, many of households have used illegal methods to catch fishes. Many economic activities in inland and coastal regions have impacted on environment and natural resources. However, they showed that they have participated in activities of protection of environment and prevention of natural resources, but the awareness is the least in Van Gia. Beside Dam Mon and Van Hung are also noted in human activities of environmental protection.

Needs of improving awareness for residence about protection of natural resources

Beside of assessment of status of participants in protection of environment and natural resources, the paper also recognizes the needs of improving awareness in protection of environment and natural resources. The results assessed that income of most of people in the surveyed areas is

normal and under normal levels. This showed that living standard of local people in study areas is rather low. These have related to needs of protection of natural resources.

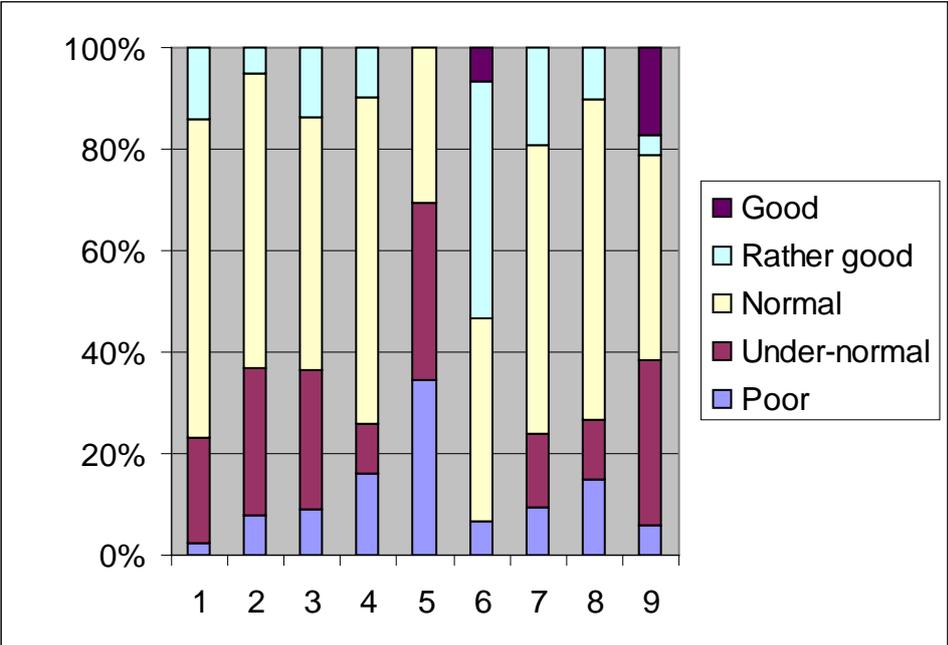


Fig. 15: Income structure of local people

When the people are asked about there is any activities of protection of environment and natural resources, so many local people in study areas have not known any activities. In Ninh Tinh and Bai Tre, more than 60% of interviewees showed that they knew some activities of prevention of natural resources and environment. This indicated the needs of environmental education in these areas are high.

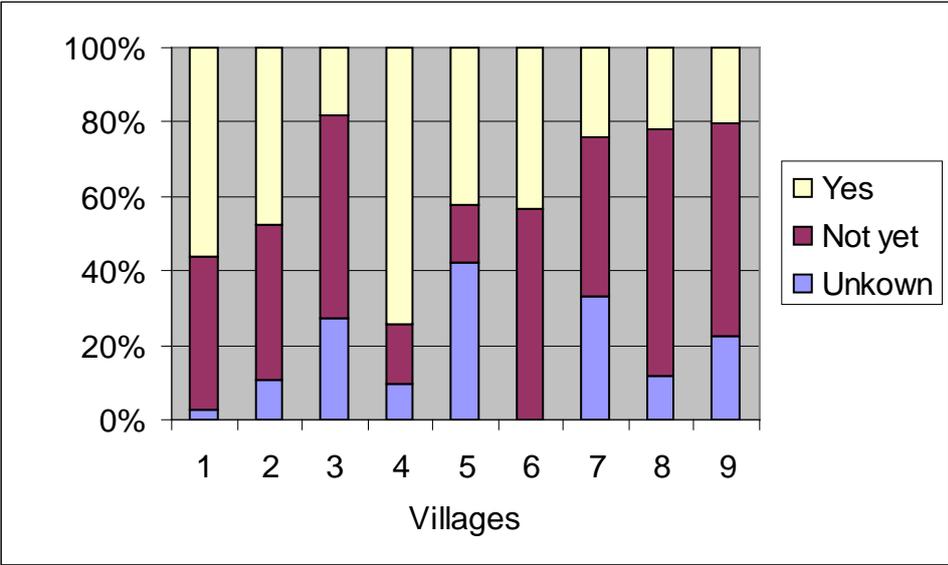


Fig. 16: Awareness about activities of environmental protection and natural resources prevention

Needs of environmental education are imaged the ready participating in environmental activities of local people is displayed in fig. 17. This need is the highest in Van Hung. In other villages, these ratios are low.

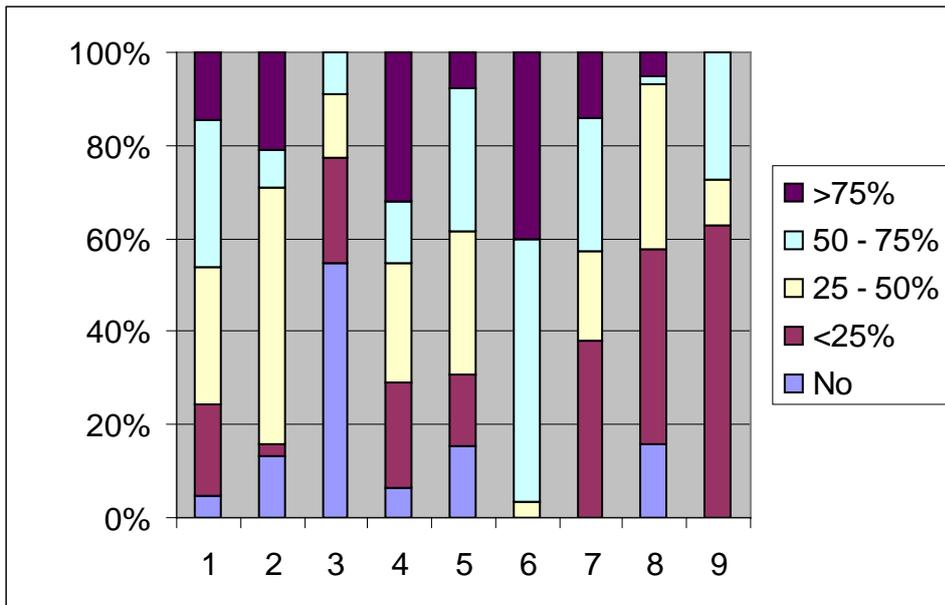


Fig. 17: Needs of participants of activities of environmental protection

Needs of environmental education also indicated in suggesting any environmental activities and participating in these activities. The results (Fig. 18 and 19) showed that if there are any activities of environmental education and protection of natural resources, they have suggested these activities should be carried out in their living places and they have been already participated in these activities.

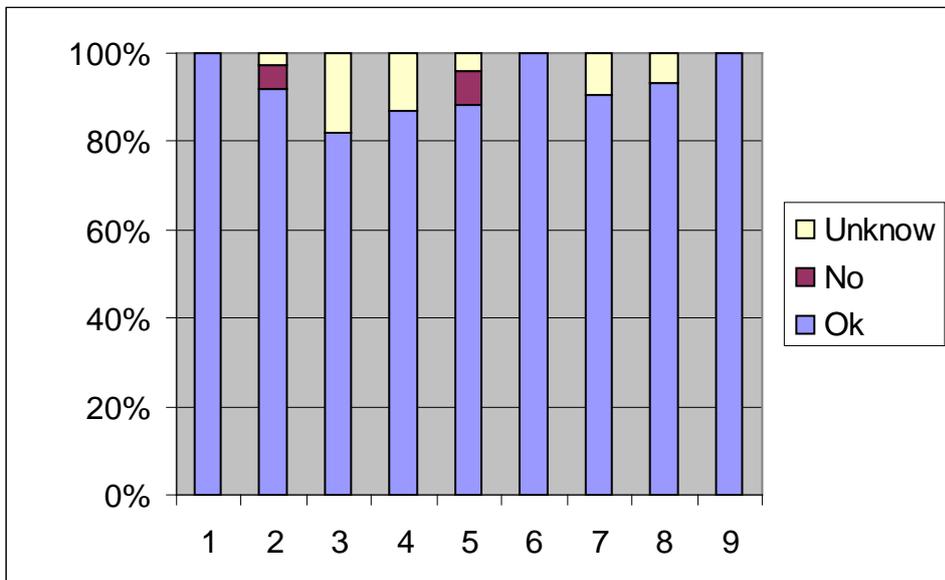


Fig. 18: Needs to carry out an environmental protection activity in villages

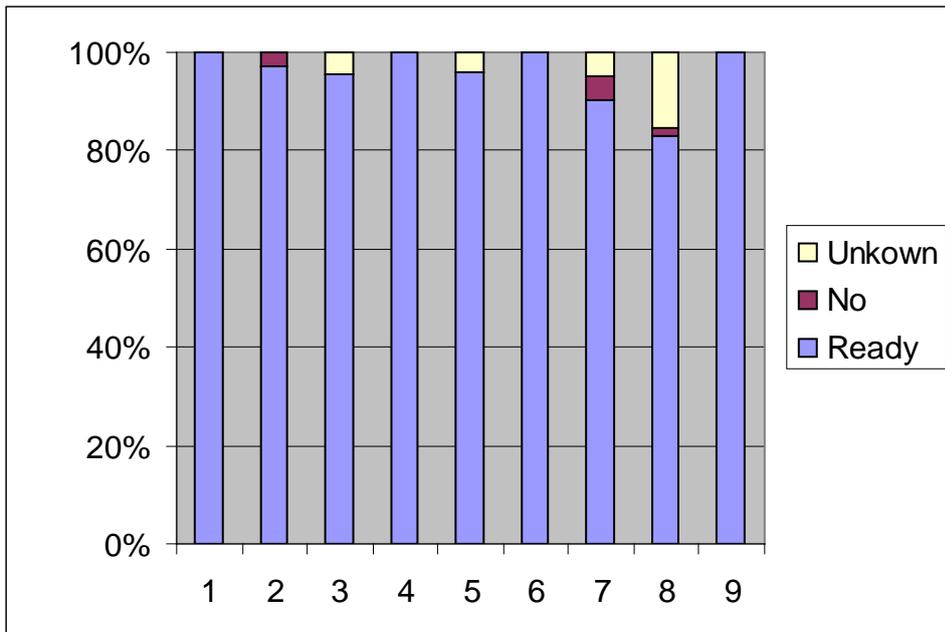


Fig. 19: Status of ready participants in environmental protection

Further, to response to activities of protection of environment and natural resources, local people will change to other economic activities if these activities are indicated to be harmful to environment and natural resources. However, this ratio is low in Van Gia villages because their awareness of protecting natural resources is low.

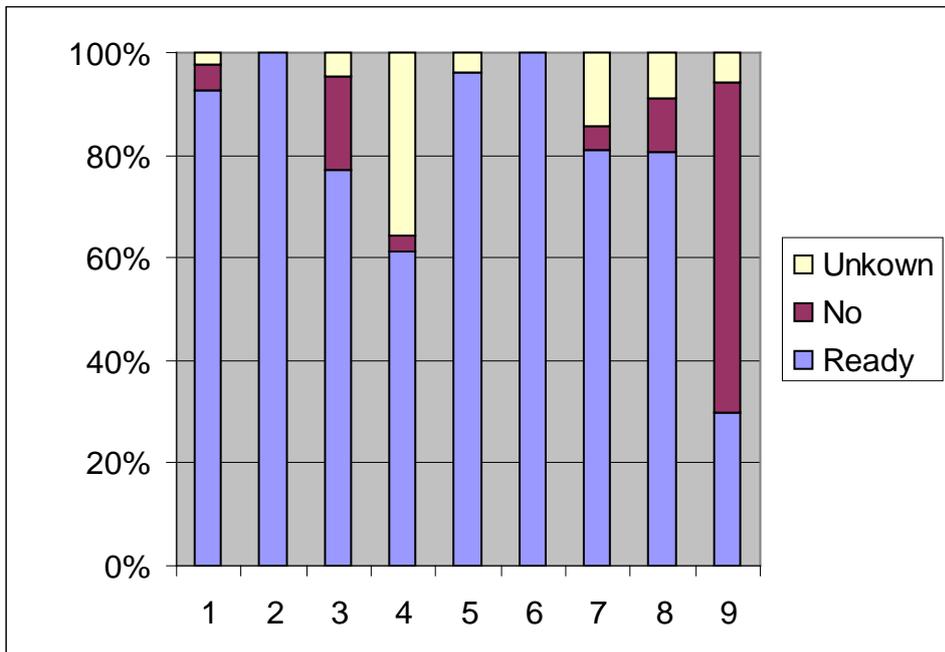


Fig. 20: Status of ready changes to another economic activities which is less affected to environment and natural resources

Conclusions

Van Phong Bay is diversity and abundance of ecosystems and natural resources but their exploitation was unsuitable, so quality and quantity of ecosystems have reduced. Communities in coastal areas of Van Phong Bay are low education, as results, these are negatively impacted to local people's awareness of natural resources and environment. In addition, the awareness also is low. The people

groups who were less awareness were at Ninh Tinh, Hai Trieu, Dam Mon, Bai Tre and Van Gia. In addition, local people have known their economic activities would be affected to natural resources but because of their life, many of households have used illegal methods to catch fishes. However, they have participated in activities of protection of environment and prevention of natural resources. The awareness is the least in Van Gia. Beside Dam Mon and Van Hung are also noted in human activities of environmental protection. And finally, needs of improving awareness of environment and natural resources are recognized in coastal villages, in which, Van Gia and Bai Tre villages are essential.

Acknowledgement

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